BISCHOFF RESERVOIR

Ripley County

2006 Fish Management Report

Clinton R. Kowalik
Assistant Fisheries Biologist

Larry L. Lehman
Fisheries Biologist

Fisheries Section
Indiana Department of Natural Resources
Division of Fish and Wildlife
I.G.C.-South, Room W273
402 W. Washington Street
Indianapolis, IN 46204

2008

EXECUTIVE SUMMARY

- Bischoff Reservoir (also known locally as Batesville Reservoir or Morris Reservoir) is a 190-acre impoundment located approximately 1 mi southwest of the small town of Morris in southeastern Indiana. It is owned by the City of Batesville and managed by the Batesville Water and Gas Utility as a water supply reservoir. An Indiana Department of Natural Resources public access site with a parking lot and concrete boat ramp is present. Electric trolling motors and gasoline outboards (up to 6 horsepower) can be used on the lake.

- A survey of largemouth bass, bluegill, and gizzard shad was conducted on Bischoff Reservoir on June 12 and 20, 2006, as part of a Division of Fish and Wildlife (DFW) work plan, which is titled, "Gizzard shad experimental management strategies." Bischoff will be used as an experimental control to determine natural fluctuations in shad populations and is scheduled to be surveyed annually from early to mid-June through 2009.

- A total of 2,271 fish, representing three species, was collected during this survey. By number, bluegill ranked first, followed by gizzard shad and then largemouth bass. By weight, bluegill ranked first, followed by largemouth bass and then gizzard shad.

- The electrofishing catch rate for gizzard shad was 188.0/h, compared to 404.5/h in 2005.

- Bluegill represented a balanced population with some fish reaching 6.0 in TL during their 4^{th} year of growth, which is average for southeastern Indiana.

- Largemouth bass did not represent a balanced population with fish most likely reaching 14.0 in TL in their 5^{th} year of growth, which is above average for southeastern Indiana.

- In Bischoff Reservoir, the DFW should maintain a 14.0-in minimum size limit on largemouth bass, continue to stock 3,040 (16/acre) channel catfish every two years, and continue to monitor the fishery.

FIGURES

Figure Page

INTRODUCTION

Bischoff Reservoir (also known locally as Batesville Reservoir or Morris Reservoir) is a 190-acre impoundment located approximately 1 mi southwest of the small town of Morris in southeastern Indiana. It is owned by the City of Batesville and managed by the Batesville Water and Gas Utility as a water supply reservoir. Construction was completed in 1960. An Indiana Department of Natural Resources (IDNR) public access site with a parking lot and concrete boat ramp is present. Electric trolling motors and gasoline outboards (up to 6 horsepower) can be used on the lake.

Bischoff Reservoir is one of the few lakes in southern Indiana where the standing crop of fish has been measured. The lake was drained by the utility in the fall of 1966 to improve water quality by removal of rough fish. As the lake drained, IDNR personnel measured and weighed all the fish. Results revealed the standing crop of fish in Bischoff Reservoir was 300 lbs per acre (Barry 1967).

Bischoff Reservoir was restocked early in 1967 with largemouth bass, redear sunfish, channel catfish, and white catfish (Ameiurus catus). Regular stockings of channel catfish were started in 1977 to maintain the channel catfish population, which was not expected to sustain itself through natural reproduction. Prior to this survey, 46,297 catfish had been supplementally stocked by the IDNR's Division of Fish and Wildlife (DFW) from 1977 through 2005.

Gizzard shad, a species that has the potential to ruin sport fisheries in impoundments, had not been collected during any surveys at Bischoff before 1993. In the 1993 survey, however, gizzard shad was found to be the dominant species by number and by weight (Lehman 1995).

Bischoff Reservoir is scheduled to be surveyed from 2005 through 2009 under a DFW work plan which is titled, "Gizzard shad experimental management strategies." The work plan objectives are:

1. Report on how the illegal introductions of gizzard shad have negatively affected sport fish populations and reduced fishing opportunities.
2. Determine the most effective way(s) to control excessive gizzard shad populations.
3. Determine how sport fish populations respond to various gizzard shad management techniques.

According to the work plan, Bischoff will be surveyed from early to mid-June each year. Only largemouth bass, bluegill, and gizzard shad will be collected. Bischoff will be used as an experimental control to determine natural fluctuations in shad populations.

METHODS

A survey of largemouth bass, bluegill, and gizzard shad was conducted June 12 and 20, 2006. A GPS unit, GARMIN GPSmap 76, was used to record the location of the fish collection sites.

Fish were collected by pulsed DC electrofishing along the shoreline on two nights with two dippers for 2.0 h. Four 15-min electrofishing stations in the southeast arm of the lake were sampled the first night. Three 15-min electrofishing stations in the north arm of the lake and one 15-min station along the dam were sampled the second night.

All largemouth bass collected and subsamples of bluegill and gizzard shad were measured to the nearest 0.1 in TL. The remaining bluegill and shad were counted but not measured. The length-frequency distributions for 1,647 bluegill and of 376 gizzard shad were created based on the proportion, by number, of each half-inch group of the subsample of 244 bluegill and of 224 shad. Fish were not weighed; average weights for fish by half-inch groups for Fish Management District 8 were used to estimate the weight of the fish sample. Fish scale samples were taken from largemouth bass, bluegill, and gizzard shad for age and growth analysis. The proportional stock density (PSD) was calculated for largemouth bass and bluegill (Anderson and Neumann 1996). The bluegill PSD was calculated using only the bluegill subsample. The Bluegill Fishing Potential (BGFP) index was used to assess bluegill fishing quality (Ball and Tousignant 1996).

RESULTS

A total of 2,271 fish, representing three species, was collected during this survey. Total weight of the fish sample was approximately 427 lbs. By number, bluegill ranked first, followed by gizzard shad and then largemouth bass. By weight, bluegill ranked first, followed by largemouth bass and then gizzard shad.

A total of 1,647 bluegill was sampled that weighed 166 lbs. They ranged in length from 1.5 to 7.5 in TL, averaging 5.0 in TL. Relative abundance was 73% by number and 39% by

weight. The electrofishing catch rate was 823.5/h, increasing from 376.5/h in 2005 (Kowalik and Lehman 2006). Bluegill represented a balanced population; the bluegill PSD was 29, however, this is a decrease from 37 in 2005. In the subsample, 26% of the bluegill were 6.0 in or longer (i.e. quality size) compared to 35% in 2005. The 2006 BGFP index was 20, which is in the good category. The 2005 BGFP index was in the fair category. Growth was similar to 2005 and back-calculated lengths indicate some bluegill reached 6.0 in during their 4th year of growth, which is average for southeastern Indiana (Figure 1).

A total of 376 gizzard shad was sampled that weighed 114 lbs. They ranged in length from 6.4 to 12.2 in TL, averaging 9.6 in TL. Relative abundance was 17% by number and 27% by weight. The electrofishing catch rate was 188.0/h compared to 404.5/h in 2005 (Kowalik and Lehman 2006). Gizzard shad were not aged.

A total of 248 largemouth bass was sampled that weighed 147 lbs. They ranged in length from 1.8 to 21.2 in TL, averaging 9.1 in TL. Relative abundance was 11% by number and 34% by weight. The electrofishing catch rate was 124.0/h, which is an increase from 63.0/h in 2005 (Kowalik and Lehman 2006). Largemouth did not represent a balanced population; the largemouth PSD was 29, which is a decrease from 52 in 2005. In this sample, 12% of the bass were 14.0 in or longer (i.e. legal size) compared to 25% in 2005. Back-calculated lengths indicated largemouth bass most likely reached 14.0 in during their 5th year of growth, which is above average for southeastern Indiana (Figure 2).

DISCUSSION

Despite the presence of shad, Bischoff Reservoir continues to provide good fishing opportunities for bluegill. Unlike the 2005 survey, bluegill were the most abundant fish in the 2006 sample. The electrofishing catch rate for bluegill and relative abundance of bluegill both increased. Despite a decrease in the bluegill PSD and the lack of bluegill 8.0 in or longer (no bluegill 8.0 in or longer have been collected in the last three surveys), the BGFP index improved from fair in the last two surveys into the good category. According to the index, this positive effect was due mostly to *good* density. The lack of large bluegill may be the result of angler harvest and/or correlated with the presence of gizzard shad. Bluegill growth remains average for southeastern Indiana.

In 2006, gizzard shad ranked second behind bluegill in relative abundance. In 2005, gizzard shad ranked first by number and weight in the sample as in 1993 when the species first appeared in a DFW survey at Bischoff (Lehman 1995). The 2006 electrofishing catch rate was less than the last two surveys. The 2006 length range of shad was similar to 2005 and the average lengths were identical. Gizzard shad directly compete with bluegill and young bass for zooplankton, which can lead to a decline in fishing.

In 2006, a lesser percentage of legal largemouth bass was collected than the two previous surveys. The bass PSD was also less than in 2005 and 2004, and was below the desired range for a balanced population. The bass catch rate, however, almost doubled. Bass reached the legal-size of 14.0 in during their 5th year of growth, which is above average for southeastern Indiana. Bass at all ages are growing as fast or faster than in 2005 and the district average.

Although the PSD has declined and less legal bass were collected, an abundance of age-2, 3, and 4 bass should keep supplying 14.0-in bass into the fishery. Considering the abundance of bluegill in the sample and the presence of shad, it does not appear that largemouth have a shortage of prey. The 14.0-in minimum size limit should remain in effect to prevent over-harvest of largemouth bass, the primary source of predation on Bischoff's small panfish and gizzard shad population.

According to the work plan, Bischoff will be surveyed from early to mid-June each year. Only largemouth bass, bluegill, and gizzard shad will be collected. Bischoff will be used as an experimental control to determine natural fluctuations in shad populations.

RECOMMENDATIONS

- The DFW should maintain the 14.0-in minimum size limit on largemouth bass at Bischoff Reservoir.

- The DFW should continue to stock 3,040 (16/acre) channel catfish fingerlings every two years as long as it is felt channel catfish should be managed in this manner. These channel catfish should average at least 8 in long to reduce mortality from bass predation.

LITERATURE CITED

Anderson, R. O. and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-481 *in* B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Ball, R. L. and J. N. Tousignant. 1996. The development of an objective rating system to assess bluegill fishing in lakes and ponds. Research report. Indiana Department of Natural Resources. Indianapolis, Indiana. 18 pp.

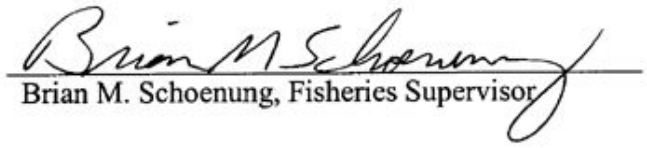
Barry, J. J. 1967. Evaluation of Creel Census, Rotenone Embayment, Gill Nets, Traps and Electro-fishing Gear Samples, by Complete Drainage of Lenape and Bischoff Reservoirs. Indiana Department of Natural Resources, Indianapolis. 34 pp.

Lehman, L. L. 1995. Bischoff Reservoir Fish Management Report, 1993. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, Indiana. 14 pp.

Kowalik, C. R. and L. L. Lehman. 2006. Bischoff Reservoir Fish Management Report, 2005. Fisheries Section, Indiana Department of Natural Resources, Indianapolis. 16 pp.

Submitted by: Clinton R. Kowalik, Assistant Fisheries Biologist
Date: April 17, 2007

Approved by: Larry L. Lehman, Fisheries Biologist

Approved by: 
Brian M. Schoenung, Fisheries Supervisor

Date: February 1, 2008

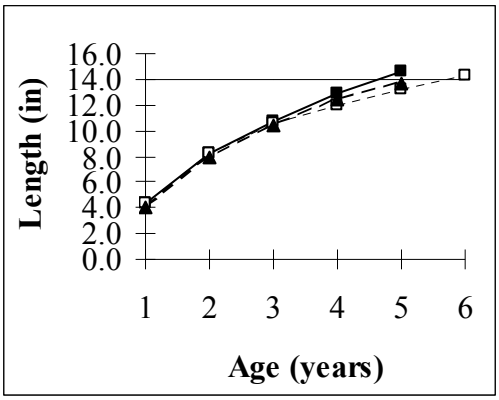


Figure 1. Bischoff Reservoir bluegill growth from 2006 survey (solid line) compared to 2005 survey (dashed line) and to average bluegill growth observed in Fish Management District 8 impoundments (dotted line).

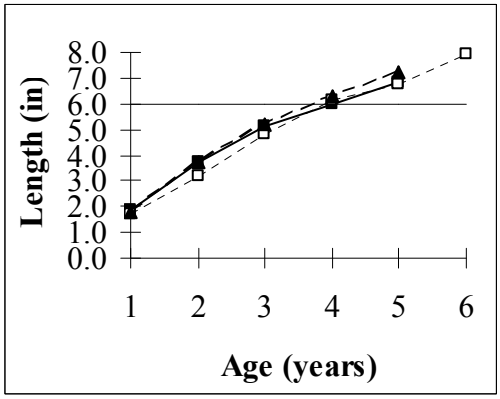


Figure 2. Bischoff Reservoir largemouth bass from 2006 survey (solid line) compared to 2005 survey (dashed line) and to average largemouth bass growth observed in Fish Management District 8 impoundments (dotted line).

LAKE SURVEY REPORT

Type of Survey: [ ] Initial Survey [X] Re-Survey

Lake Name	County	Date of survey (Month, day, year)
Bischoff Reservoir	Ripley	June 12 and 20, 2006
Biologist's name		Date of Approval (Month, day, year)
Larry L. Lehman		January 31, 2008

LOCATION

Quadrangle Name	Range	Sections
Batesville, IND. 1961. Photorevised 1980	12E	27, 28, 33, and 34
Township	Nearest Town	
10N	Morris	

ACCESSIBILITY

State owned public access site	Privately owned public access site	Other access site: Impoundment is
Two-lane IDNR concrete boat ramp with parking	One private boat ramp is present.	owned by City of Batesville.

Surface acres	Maximum depth	Average depth	Volume (acre feet)	Water level (Feet MSL)	Extreme fluctuations
190*	27 feet**	8.1 feet*	1,541*	959	953.0-959.5 feet MSL

Location of benchmark: Along State Road 46 in town of Morris

INLETS

Name	Location	Origin
Several unnamed intermittent inlets enter impoundment along its shoreline.		

OUTLETS

Name	Location
Bobs Creek	Below principal spillway in dam

Water level control: Grass emergency spillway around south end of dam. Principal spillway is 5-foot square concrete drop inlet. Ten-inch drawdown tube is present.

POOL	ELEVATION (feet MSL)	ACRES
TOP OF DAM		
TOP OF FLOOD CONTROL POOL		
NORMAL POOL	959	190
TOP OF MINIMUM POOL		
STREAMBED		

Bottom type

	Boulder
X	Gravel
X	Sand
	Silt loam
	Clay loam
	Marl

Watershed use: Watershed covers approximately 3,000 acres. Approximately 1% is commercial and 4% is residential. The remainder is forest (~10%), agriculture (~38%), and grass/pasture (~41%). (Source is http://pasture.ecn.purdue.edu)

Development of shoreline: Public access site with a concrete boat ramp, a courtesy dock, and parking lot is present. Twenty-six residences and some private docks sit along the shoreline. Housing development (Hillindale Commons) with a private boat ramp is located on the north arm of the lake.

Previous surveys and investigations: Hydrographic survey 1963. Fishery survey 1963. Creel census 1965 and 1966. Evaluation of survey methods 1966. Drained 1966. Restocked 1967. Fishery survey 1970. Research project 1973-1977. Fishery survey 1984. Lake enhancement feasibility study 1989-1991. Fishery surveys 1993 and 2004. Gizzard shad study 2005.

*According to lake enhancement feasibility study (1989-1991). **According to hydrographic survey 1963.

SAMPLING EFFORT					
ELECTROFISHING	Day hours 0		Night hours 2.00**		Total hours 2.00
TRAP NETS	Number of traps 0		Number of Lifts		Total effort
GILL NETS	Number of nets 0		Number of Lifts		Total effort
ROTENONE	Gallons 0	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls none

PHYSICAL AND CHEMICAL CHARACTERISTICS			
Color		Turbidity Feet Inches (SECCHI DISK)	
Alkalinity (ppm)* Surface: Bottom:		pH Surface: Bottom:	
Conductivity: 6/12/06 195 micromhos/cm Conductivity: 6/20/06 210 micromhos/cm		Air temperature °F	
Water chemistry GPS coordinates: N W			

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)
SURFACE	***		36			72		
2			38			74		
4			40			76		
6			42			78		
8			44			80		
10			46			82		
12			48			84		
14			50			86		
16			52			88		
18			54			90		
20			56			92		
22			58			94		
24			60			96		
26			62			98		
28			64			100		
30			66					
32			68					
34			70					

COMMENTS
**6/12/06 electrofisher settings: 530 volts DC, output mode 60 pps DC, pulse width 3 ms (~4 amps); ***71°F
**6/20/06 electrofisher settings: 530 volts DC, output mode 60 pps DC, pulse width 4 ms (~5 amps); ***81°F
Bischoff Reservoir was at normal pool 6/12/06 and 6/20/06.

*ppm-parts per million

SPECIES AND RELATIVE ABUNDANCE OF FISHES COLLECTED BY NUMBER AND WEIGHT					
*COMMON NAME OF FISH	NUMBER	PERCENT	LENGTH RANGE (inches)	WEIGHT (pounds)	PERCENT
Bluegill	1,647	72.5	1.5-7.5	166.38	39.0
Gizzard shad	376	16.6	6.4-12.2	113.59	26.6
Largemouth bass	248	10.9	1.8-21.2	147.05	34.4
10 common carp ranging from 21.6 in					
to 30.3 in and weighing 86.02 lbs					
were collected and destroyed.					
Totals (3 species)	2,271	100.0		427.02	100.0

*Common names of fishes recognized by the American Fisheries Society.

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF: Bluegill Bischoff Reservoir 6/12/06 and 6/20/06									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5	13	0.8	< 0.01	1	19.5				
2.0	20	1.2	< 0.01	1	20.0				
2.5	54	3.3	< 0.01	1	20.5				
3.0	101	6.1	0.02	1	21.0				
3.5	81	4.9	0.03	1	21.5				
4.0	68	4.1	0.04	1, 2	22.0				
4.5	223	13.5	0.06	2, 3	22.5				
5.0	310	18.8	0.08	2, 3	23.0				
5.5	263	16.0	0.11	2, 3	23.5				
6.0	250	15.2	0.15	3	24.0				
6.5	203	12.3	0.19	3, 4	24.5				
7.0	47	2.9	0.24	5	25.0				
7.5	14	0.9	0.30	4, 5	25.5				
8.0					26.0				
8.5					TOTAL	1,647			
9.0									
9.5						Subsample PSD = 64/229(100) = 27.9			
10.0									
10.5				According to subsample, % ≥ 6.0 inches = 64/244(100) = 26.2					
11.0									
11.5						Bluegill Fishing Potential Index = 20 (good)			
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	823.5/h	GILL NET CATCH	N/A	TRAP NET CATCH	N/A

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF: Gizzard shad Bischoff Reservoir 6/12/06 and 6/20/06									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5					23.5				
6.0					24.0				
6.5	1	0.3	0.09	Not aged	24.5				
7.0					25.0				
7.5					25.5				
8.0	14	3.7	0.17		26.0				
8.5	32	8.5	0.20		TOTAL	376			
9.0	69	18.4	0.25						
9.5	113	30.1	0.28						
10.0	87	23.1	0.34						
10.5	40	10.6	0.40						
11.0	8	2.1	0.46						
11.5	7	1.9	0.51						
12.0	5	1.3	0.60						
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	188.0/h	GILL NET CATCH	N/A	TRAP NET CATCH	N/A

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF: Largemouth bass Bischoff Reservoir 6/12/06 and 6/20/06									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0	1	0.4	3.74	—
1.5					19.5	2	0.8	3.84	—
2.0	2	0.8	< 0.01	0	20.0				
2.5					20.5	2	0.8	5.31	—
3.0					21.0	2	0.8	4.76	—
3.5					21.5				
4.0	1	0.4	0.03	1	22.0				
4.5	4	1.6	0.04	1	22.5				
5.0	27	10.9	0.05	1	23.0				
5.5	26	10.5	0.07	1	23.5				
6.0	15	6.0	0.10	1	24.0				
6.5	9	3.6	0.12	1, 2	24.5				
7.0	2	0.8	0.16	1, 2	25.0				
7.5	4	1.6	0.19	2	25.5				
8.0	18	7.3	0.24	2	26.0				
8.5	17	6.9	0.28	2	TOTAL	248			
9.0	19	7.7	0.34	2, 3					
9.5	12	4.8	0.41	2, 3		PSD = 44/151(100) = 29.1			
10.0	20	8.1	0.48	3					
10.5	7	2.8	0.57	3		% ≥ 14.0 inches = 30/248(100) = 12.1			
11.0	10	4.0	0.64	3					
11.5	9	3.6	0.74	3					
12.0	4	1.6	0.84	3, 4					
12.5	7	2.8	0.97	3, 4					
13.0	1	0.4	1.09	4					
13.5	4	1.6	1.24	4					
14.0	3	1.2	1.39	4					
14.5	6	2.4	1.59	4, 5					
15.0	2	0.8	1.72	5					
15.5	4	1.6	1.93	4, 5					
16.0	1	0.4	2.06	—					
16.5	2	0.8	2.29	5					
17.0	3	1.2	2.40	5, 6					
17.5									
18.0	2	0.8	3.20	—					
18.5									

ELECTROFISHING CATCH	124.0/h	GILL NET CATCH	N/A	TRAP NET CATCH	N/A

Species Bluegill	YEAR CLASS	Number of fish aged	SIZE RANGE	BACK CALCULATED LENGTH (inches) AT EACH AGE							
				1	2	3	4	5	6	7	8
Intercept= 0.8"	2005	24	1.5-3.9	2.0							
	2004	11	4.0-5.3	1.9	3.8						
	2003	16	4.7-6.6	1.8	3.6	5.1					
	2002	2*	6.7-7.5	1.8	3.7	5.3	6.6				
	2001	4	6.9-7.3	1.8	3.6	5.1	6.0	6.8			
	AVERAGE LENGTH			1.9	3.7	5.1	6.0	6.8			
	NUMBER AGED			55	31	20	4	4			

Species Largemouth bass	YEAR CLASS	Number of fish aged	SIZE RANGE	BACK CALCULATED LENGTH (inches) AT EACH AGE							
				1	2	3	4	5	6	7	8
Intercept= 0.8"	2005	28	4.1-6.8	4.9							
	2004	22	6.7-9.4	4.4	7.7						
	2003	30	9.0-12.6	4.2	7.8	9.9					
	2002	19	11.8-15.5	4.0	8.1	10.7	12.6				
	2001	7	14.3-16.8	4.6	9.1	11.3	13.3	14.6			
	2000	1*	16.9	5.4	7.9	11.0	13.1	15.1	16.3		
	AVERAGE LENGTH			4.4	8.2	10.7	12.9	14.6			
	NUMBER AGED			106	78	56	26	7			

*Not included in average length calculations.

GPS LOCATION OF SAMPLING EQUIPMENT			Bischoff Reservoir 6/12/06 and 6/20/06					
GILL NETS			TRAP NETS			ELECTROFISHING		
1	N	W	1	N	W	1	N 39.27235	W -85.17970
	N	W	2	N	W		N 39.27403	W -85.18170
2	N	W	3	N	W	2	N 39.27079	W -85.18547
	N	W	4	N	W		N 39.26777	W -85.18396
3	N	W	5	N	W	3	N 39.27066	W -85.18975
	N	W	6	N	W		N 39.26918	W -85.18696
4	N	W	7	N	W	4	N 39.27180	W -85.18690
	N	W	8	N	W		N 39.27213	W -85.18871
5	N	W	9	N	W	5	N 39.28261	W -85.18789
	N	W	10	N	W		N 39.28327	W -85.18770
6	N	W	11	N	W	6	N 39.28050	W -85.19261
	N	W	12	N	W		N 39.27869	W -85.19518
7	N	W	13	N	W	7	N 39.27532	W -85.19949
	N	W	14	N	W		N 39.27418	W -85.19666
8	N	W	15	N	W	8	N 39.27604	W -85.19403
	N	W	16	N	W		N 39.27731	W -85.19114
9	N	W	17	N	W	9	N	W
	N	W	18	N	W		N	W
10	N	W	19	N	W	10	N	W
	N	W	20	N	W		N	W
11	N	W				11	N	W
	N	W					N	W
12	N	W				12	N	W
	N	W					N	W
13	N	W				13	N	W
	N	W					N	W
14	N	W				14	N	W
	N	W					N	W
15	N	W				15	N	W
	N	W					N	W
16	N	W				16	N	W
	N	W					N	W
17	N	W				17	N	W
	N	W					N	W
18	N	W				18	N	W
	N	W					N	W
19	N	W				19	N	W
	N	W					N	W
20	N	W				20	N	W
	N	W					N	W